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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/578,757

10/26/2006

Jonathan Andrew Fuller

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63767

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EXAMINER

XU, XIAOYUN

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/578,757	<b>Applicant(s)</b> FULLER ET AL.	
	<b>Examiner</b> ROBERT XU	<b>Art Unit</b> 4112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 26-70 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/5/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Summary***

1. This is the initial Office action based on the 10/578,757 application filed on May 5, 2006.
2. Claims 1-25 are canceled. Claims 26-70 are pending and have been fully considered.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 26, 27, 30, 31, 38, 39, 54-57, 61 are rejected under 35 U.S.C. 102(b) as being anticipated by WU [US Patent No. 6,200,532].

In regard to Claim 26, WU discloses a device for performing blood coagulation assay, particularly prothrombin times and activated partial thromboplastin times (see abstract). The device comprises a disposable strip containing a chamber for holding a quantity of blood sample, a magnetic bender body in the chamber and a magnetic field generator underneath the chamber (see abstract, Col. 5, lines 29-36, 62-67). The magnetic field causes the magnetic bender body to migrate to and fro (vibrate) within the chamber (see Col. 5, line 1-6).

In regard to Claim 54, WU discloses a method for performing blood coagulation assay, particularly prothrombin times and activated partial thromboplastin times (see

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abstract). The method comprises steps of providing a blood sample in a disposable strip containing a chamber, and applying magnetic field to the chamber (see abstract, Col. 5, lines 29-36, 43-45). The magnetic field causes the magnetic bender body to move to and fro (vibrate) within the chamber through uncoagulated blood (see Col. 5, line 1-6).

In regard to Claim 27, WU discloses that through the attachment of the piezo film to the magnetic bender, movement of the magnetic bender body is detected by measuring electric signal generated at the piezo film characterized by its frequency and amplitude due to movement of the attached metal film (Col. 5 lines 12-16).

In regard to Claim 30, WU discloses that the chamber is formed in a disposable strip (Col. 5, lines 62-67; Col. 6, line 1-4).

In regard to Claim 31, WU discloses that the chamber having the magnetic bender body is elongated and has substantially uniform cross-section (see Figure 1 and 2).

In regard to Claim 38, WU teaches that the bender body comprises an iron-based material, which experiences a force when placed in a magnetic field (Col.4, lines 60-63).

In regard to Claims 39 and 61, WU discloses that a clotting reagent is disposed in the chamber (Col. 5, lines 38-42).

In regard to Claim 55, WU discloses using an AC excitation generator coil to produce an AC electromagnetic field. The AC electromagnetic field cyclically provides a first and a second magnetic field. The first magnetic field drives an iron-based magnetic bender to move in a first direction and the second magnetic field drives the magnetic

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bender body to move in a second direction, the second direction is opposite to the first direction (Col. 4, line 66-67; Col. 5, line 1-6).

In regard to Claim 56, it is known that the AC electromagnetic fields such as the one disclosed by WU generally has the profile of Sines. The Sines profile has short pulse in each direction and with zero field strength between the pulses.

In regard to Claim 57, WU discloses that the duration of each pulse is 0.005-0.5 ms (1-10 kHz) (Col. 5, lines 9-12).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 29, 32-37, 40, 41, 43-51, 58, 59, 63-68 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over WU [US Patent No. 6,200,532].

In regard to Claims 40 and 63, WU discloses a device and method for determining the coagulation status of a liquid, the device comprising a chamber for holding a quantity of

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blood sample, a magnetic bender body disposed in the chamber and a magnetic device co-operating with the chamber and provides a magnetic field which causes the bender body to move to and fro within the chamber through uncoagulated blood sample (see example 1). WU does not specifically recite that the cross-section area of the bender body measured in a plane generally perpendicular to its normal direction of travel in use is at least half that of the chamber in the same plane. However, WU teaches that the purpose of the magnetic bender body is to mix the plasma sample with an appropriate reagent (see Col.5, lines 3-6). The efficiency of mixing the plasma sample with the reagent depends on the cross-section area of the bender body and the space between the edge of the bender body and the wall of the chamber that holds the sample. These parameters can be optimized by routine experimentation. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one of ordinary skill in the art to optimize the cross-section area of the bender body and the space between the bender body and the chamber wall to achieve better mixing efficiency.

In regard to Claim 41, WU discloses that through the attachment of the piezo film to the magnetic bender, movement of the magnetic bender is detected by measuring electric signal generated at the piezo film characterized by its frequency and amplitude due to movement of the attached metal film (Col. 5 lines 12-16).

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In regard to Claim 44, WU discloses that the chamber is formed in a disposable strip (Col. 5, lines 62-67; Col. 6, line 1-4).

In regard to Claim 45, WU discloses that the chamber having the magnetic bender is elongated and has substantially uniform cross-section (see Figure 1 and 2).

In regard to Claims 29 and 43, WU discloses that a 300 ul plasma sample was delivered onto the sample well in the test strip for both sample strip and control strip. The free volume in the instant claim when chamber contains the body is less than 10 ul., The free volume in the sample chamber equals the total volume of the chamber minus the volume of the bender body. The volume of the bender body and the free volume left in the chamber can affect the mixing efficiency of the sample with the reagent. These parameters can be optimized by routine experimentation. As has been discussed with respect to Claim 40, "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one of ordinary skill in the art to optimize the volume of the bender body and the free volume left in the chamber in order to achieve better mixing efficiency.

In regard to Claims 32 and 46, WU discloses that the reaction chamber is 0.5x1.5" in size and 0.005" in thickness (Col. 6, lines 27-31). The length of the chamber in the instant claim is between 3 and 5 mm. As has been discussed in respect to Claim 40, in order to achieve better mixing efficiency, the length of the chamber can be optimized by routine experimentation. Therefore, it would have been obvious for one of

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ordinary skill in the art to optimize the length of the chamber to achieve better mixing efficiency.

In regard to Claims 33 and 47, WU discloses that the magnetic bender body is elongated (see Figure 2). WU does not specifically recite that the bender has a cross-section of substantially the same shape as the cross-section of the chamber. However, solely based on the drawing of the Figure 2, one cross-section of the bender body has similar shape as the cross-section of the chamber. Similar shape of the bender body may increase the efficiency of mixing. At the time of the invention, it would have been obvious for one of ordinary skill in the art to select similar shape for the bender body.

In regard to Claims 34, 35, 48 and 49, WU does not specifically recite the clearance between the bender body and walls of the chamber. As has been discussed in respect to Claim 40, in order to achieve better mixing efficiency, the relative clearance between the bender body and the walls of the chamber can be optimized by routine experimentation. Therefore, at the time of the invention, it would have been obvious for one of ordinary skill in the art to optimize the relative clearance between the bender body and the walls of the chamber to achieve better mixing result.

In regard to Claims 36, 37, 50, and 51, WU does not specifically recite the length of the bender body movement. As has been discussed in respect to Claim 40, the length of the chamber and bender body and the resulting moving distance of bender body within the chamber can be optimized by routine experimentation to achieve better mixing efficiency. At the time of the invention, it would have been obvious to one of ordinary skill in the art to optimize the length of the chamber and body and the resulting

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moving distance of the bender body within the chamber to achieve better mixing efficiency.

In regard to Claim 52, WU teaches that the bender body comprises an iron-based material, which experiences a force when placed in a magnetic field (Col.4, lines 60-63).

In regard to Claim 53, WU discloses that a clotting reagent is disposed in the chamber (Col. 5, lines 38-42).

In regard to Claims 58 and 67, WU discloses the frequency of the electromagnetic field is 1 to 100 kHz (Col. 5, line 9-12). Therefore, the magnetic body under the field should move at this frequency. The frequency in WU's device is higher than the frequency in the instant claim. The frequency of the magnetic body move to and fro within the chamber depends on the distance the magnetic body moves and the area of the cross-section of the magnetic body. These parameters can be optimized by routine experimentation to achieve better mixing efficiency. At the time of the invention, it would have been obvious to one of ordinary skill in the art to optimize the frequency of the magnetic body movement to achieve a better result.

In regard to Claims 59 and 68, WU does not recite the magnitude of the electromagnetic field. The right magnitude of the electromagnetic field depends on the mass of the magnetic body and how fast it moves. At the time of the invention, it would have been obvious to one of ordinary skill in the art to optimize the magnitude of the magnetic field by routine experimentation to achieve the better mixing result.

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In regard to Claim 64, WU discloses using an AC excitation generator coil to produce an AC electromagnetic field. The AC electromagnetic field cyclically provides a first and a second magnetic field. The first magnetic field drives an iron-based magnetic bender to move in a first direction and the second magnetic field drives the magnetic bender body to move in a second direction, the second direction is opposite to the first direction (Col. 4, line 66-67; Col. 5, line 1-6).

In regard to Claim 65, it is known that the AC electromagnetic fields such as the one disclosed by WU generally has the profile of Sines. The Sines profile has short pulse in each direction and with zero field strength between the pulses.

In regard to Claim 66, WU discloses that the duration of each pulse is 0.005-0.5 ms (Col. 5, lines 9-12).

In regard to Claim 70, WU discloses that a clotting reagent is disposed in the chamber (Col. 5, lines 38-42).

8. Claims 28, 42, 60 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over WU [US Patent No. 6,200,532] as applied to Claims 29, 32-37, 40, 41, 43-51, 58, 59, 63-69 and 70 above, and further in view of GRIEBELER (US Patent No. 5,315,244).

In regard to Claims 28, 42, 60, 69, WU teaches using electronic sensor to detect the movement of the bender body. WU does not teach using magnetic field sensor to detect the movement of the bender body. The applicant is advised that the Supreme Court recently clarified that a claim can be proved obvious merely by showing that use

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of known technique to improve similar devices (methods, or products) in the same way (See KSR Int'l v. Teleflex Inc., 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007)) (see MPEP § 2143).

In this regard, GRIEBELER teaches magnetic sensor for measuring the position, velocity and /or direction of movement of an object (see abstract). WU discloses the similar device as the device in the instant claim. Both devices use magnetic field to move a body back and forth inside a reaction chamber to mix the blood sample with reagent. The mere difference is that WU uses electronic sensor to detect the movement of the body, and the instant claim uses magnetic sensor to detect the movement of the body. Both electronic sensor taught by WU and magnetic sensors taught by GRIBELLER are known techniques at the time of the invention. Using of known technique (magnetic sensor) to improve similar device (device for determining the coagulation status of a blood sample) in the same way (detecting the movement of the mixing body) would have been obvious to one of ordinary skill in the art.

In regard to Claim 62, WU discloses a method of determining the coagulation status of a blood sample disposed in a chamber (see abstract). The bender body comprises an iron-based material which experiences a force when placed in a magnetic field (Col.4, lines 60-63).

WU teaches using electronic sensor to detect the movement of the bender body. WU does not teach using magnetic field sensor to detect the movement of the bender body. As has been discussed in respect to claims 28, 42, and 60 above, using of known technique (magnetic sensor) to improve similar device (device for determining the

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coagulation status of a blood sample) in the same way (detecting the movement of the mixing body) would have been obvious to one of ordinary skill in the art.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT XU whose telephone number is (571)270-5560. The examiner can normally be reached on Mon-Thur 7:30am-5:00pm, Fri 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571)272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/BRIAN J. SINES/  
Primary Examiner, Art Unit